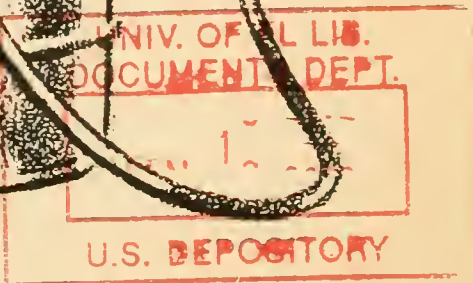


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Hand SPRAYERS and DUSTERS



U.S. DEPARTMENT OF AGRICULTURE

Home and Garden Bulletin No. 63

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Hand SPRAYERS and DUSTERS

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Hand-operated sprayers and dusters are effective weapons for use with pesticides to control insects, weeds, and plant diseases in the home, in the yard and garden, and on the farm.

In the home, this equipment is important in protecting the family from insects that carry diseases, contaminate and destroy food, damage and destroy clothes, and cause personal discomfort.

In the yard and garden, sprayers and dusters are essential in protecting flowers, ornamental shrubbery, trees, vegetables, and fruit crops from insects and diseases. When used with weed-killing chemicals, this equipment simplifies the chore of eliminating unsightly weeds from the lawn.

On the farm, hand-operated, mobile sprayers and dusters are useful for many spraying or dusting jobs where the use of larger and more expensive

equipment may not be justified. They can also be used for spot treatment of pastures and field and forage crops to supplement larger power-operated units.

Other farm uses include: Controlling pests on poultry, cattle, and hogs; cleaning and disinfecting poultry and livestock buildings; applying white-wash and shingle stain; fighting small fires; applying rust inhibitors, detergents and other grease solvents; and eradicating weeds and brush.

TYPES OF SPRAYERS AND DUSTERS

There is a type and size of sprayer or duster for every application of pesticide (insecticide, fungicide, or herbicide). Some units serve multiple purposes; others are designed for

specific purposes. The choice of a sprayer or duster depends on the size of the job, the type of application desired, and the type of pesticide you use.

Sprayers are designed for applying three types of pesticide sprays—space sprays, residual (or surface) sprays, and dual-purpose sprays. Read the container label to make certain you apply the pesticide correctly.

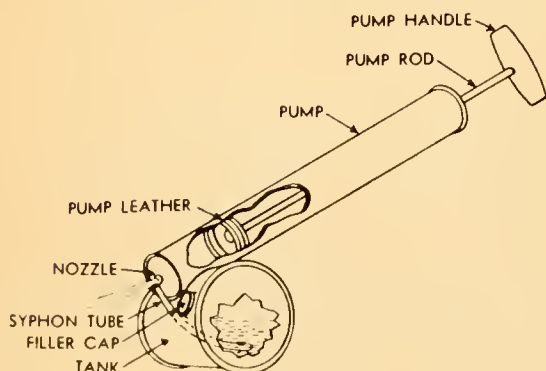
To apply a space spray, use a sprayer with a nozzle that produces fine droplets, which remain floating in the air. Direct the spray upward to fill the room or enclosure with a floating fog or mist.

To apply a residual (or surface) spray, use a nozzle or nozzle adjustment that produces a coarse-droplet spray. Such a spray does not float off into the air. Wet the surface to the point of runoff.

To apply a dual-purpose spray, use a nozzle or nozzle adjustment that produces a medium-fine spray.

Household Sprayers

Two popular types of household units are available—intermittent and



BN-8493-X

Intermittent-type household sprayer.

Pesticides are commonly available for formulating liquid sprays as solutions, emulsions, or wettable-powder suspensions for control of insects, plant diseases, or weeds. Pesticides are also available as dust mixtures for insect and plant-disease control.

For more specific information about pesticides, consult your county agent or write to the U.S. Department of Agriculture for bulletins about the particular pests or diseases you wish to control.

continuous pressure sprayers. Both types are used to apply sediment-free spray material for controlling flies, mosquitoes, roaches, moths, and other household pests. They are economical to buy and to operate.

Intermittent sprayers discharge the spray material only with each forward stroke of the pump. The nozzle of an intermittent sprayer delivers an atomized, or fine-droplet, spray and is not adjustable.

Continuous sprayers develop and maintain a constant pressure, and deliver a continuous spray discharge of uniform pattern while the pump is being operated. This feature produces a more even coverage and a faster spraying job. Most continuous sprayers have interchangeable nozzles or adjustable nozzles; they can deliver a medium-fine spray, a fine-droplet space spray, or a coarse-droplet spray. The choice of nozzle or nozzle adjustment depends on the pest control problem and on the type of pesticide you wish to apply.

Household sprayers are available in sizes ranging from a few ounces to 3 quarts. Tanks are made of glass, tinplate, galvanized or stainless steel, brass, or copper.

It is not advisable to use household sprayers for applying spray materials that contain suspended solids, because the nozzle opening is usually small and will clog.

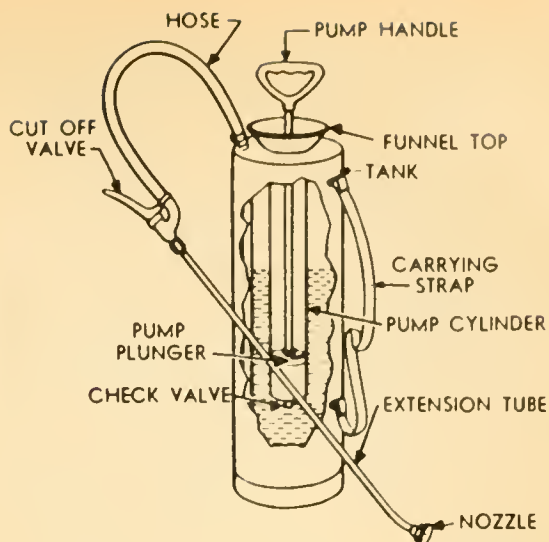
Aerosol Bomb

An aerosol bomb is a small self-contained unit generally used for space treatment in the control of flies, mosquitoes, and other insects found around the home. This type of sprayer consists of a pressure can with a discharge valve and nozzle at the top, and a tube extending from the valve to the bottom of the can. A propellant material is formulated with the spray and placed in the can at the time it is assembled. The propellant provides the pressure and energy to discharge and atomize the spray.

Residual spray may be applied in some instances to limited areas with an aerosol bomb, but this method of application is not economical compared with manually operated sprayers. Always store aerosol bombs in a cool place and never throw used ones into an incinerator.

Compressed-Air Sprayers

Compressed-air sprayers are simple in design and operation and are relatively inexpensive to buy and maintain. They are commonly used for applying insect and plant-disease



BN-8494-X

Compressed-air sprayer.

sprays around the home and farm buildings, on flowers, shrubs, fruits, and vegetables. They are also useful for spot and small-area spraying to supplement larger spraying units. Other uses include the spraying of weeds, livestock, and poultry houses.

The essential parts of a compressed-air sprayer are: The tank, air pump, discharge tube (from the bottom of the tank to the hose), spray hose, extension spray tube, spray-control valve, and nozzle. Small sprayers are equipped with a carrying handle, large ones with a shoulder strap. The tank is fitted with a pressure-type filler cap. A funnel-type top is provided on some models to make filling easier. Some models have an open-top design with a larger opening; they are easily filled or drained and can be readily and thoroughly cleaned.

Tanks are usually made of galvanized steel, but some models are available in stainless steel, copper, or brass for longer service life. The tanks are 1½ to 5 gallons in size.

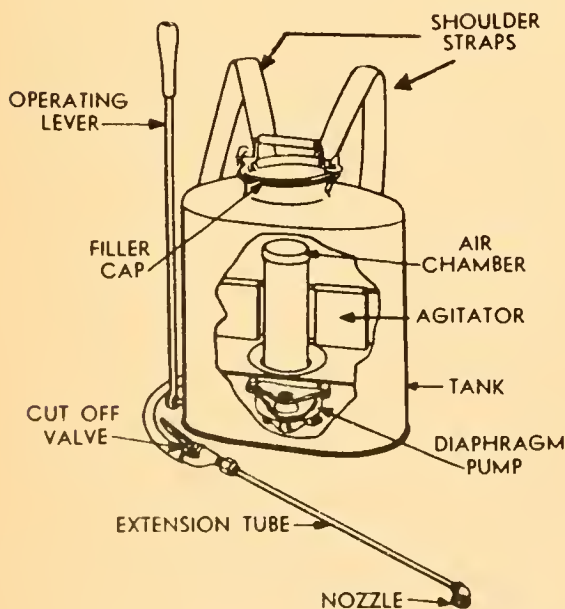
For best results in spraying, fill the



BN-8481-X

Compressed-air sprayer adapted for applying weed-control spray to lawns.

tank not more than three-fourths full of spray material. This leaves an air space at the top for building up air pressure with the pump. The normal operating pressure ranges from 30 to 50 pounds and is maintained by oc-



BN-8485-X

Knapsack sprayer.

casional pumping. If wettable-powder material is used, mix it well in a separate container and strain it into the tank. Shake the tank occasionally to keep the spray material mixed and to prevent settling. Use caution in opening the sprayer while there is any air pressure remaining in the tank.

Sprayers are equipped with various types of nozzles to provide different spray patterns such as hollow cone, solid cone, flat fan, or solid stream. Some models have an adjustable nozzle to provide a range of droplet sizes from fine, cone-shaped fog for close spraying, to coarser, long-range spray or solid stream.

Knapsack Sprayers

Knapsack sprayers, as indicated by the name, are carried on the back by means of shoulder straps. Some models have built-in spray pumps of piston or diaphragm type, which the operator pumps continuously to maintain the necessary pressure. The pump handle on some models may be attached at either side to permit right-hand or left-hand pumping as desired by the operator. A pressure chamber is provided to eliminate pulsations and give a uniform pressure. Other models are equipped with a double-acting slide-type pump. Spray pressures range from 80 to 180 pounds.

Agitation of spray material in the tank is provided by a mechanical agitator in some models and by hydraulic or jet agitation in others. Tanks are generally made of galvanized steel, but some models are available in copper or stainless steel. Tank sizes range from 4 to 6 gallons.



BN-8482-X

Applying herbicide with a knapsack sprayer.

Bucket, Barrel, and Slide Pumps

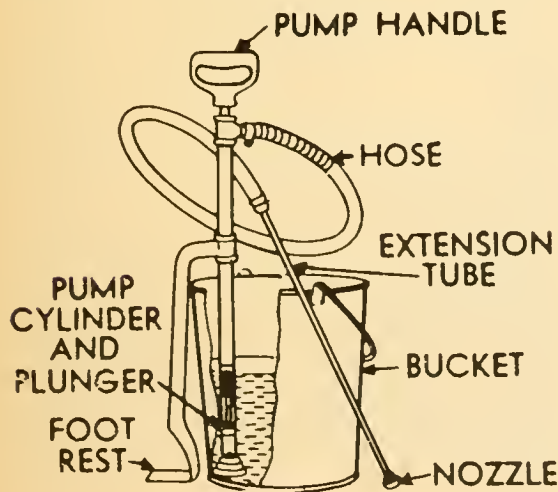
Sprayers using these types of pumps are efficient, inexpensive, and suitable for occasional spraying needs where high pressure and portability are necessary but where more expensive equipment is not justified. The spray container for each type must be

furnished by the user. Bucket and slide pumps develop pressures of 150 to 175 pounds. They are adapted for residual spraying of shrubbery, vegetables, flowers, and small fruit trees; for spraying livestock; for whitewashing and disinfecting. They may also be used as emergency fire-fighting equipment. Barrel pumps are suitable for spraying shade trees and small orchards, and for other jobs requiring high pressure and greater pump capacity.

The bucket pump is a simple plunger type equipped with an air chamber for continuous pressure and discharge. A footrest bracket attached to the pump supports and holds it in position for spraying. Pressure of about 250 pounds can be developed.

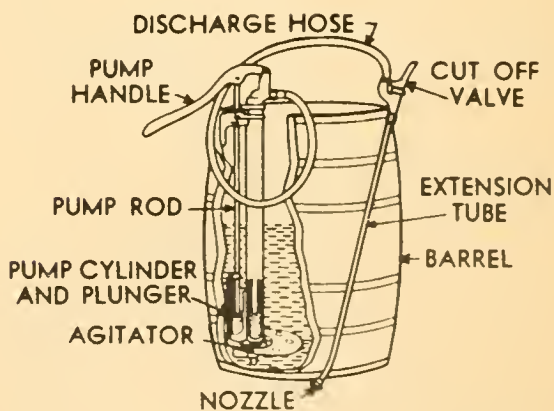
The barrel pump is generally a heavily constructed plunger type, equipped with paddle or dasher agitator. It is designed to be attached to a barrel or tank. Pressure of about 250 pounds can be developed.

The slide pump contains a telescoping plunger-type unit that is also an integral part of the discharge system. It provides a pressure of about 180 pounds.



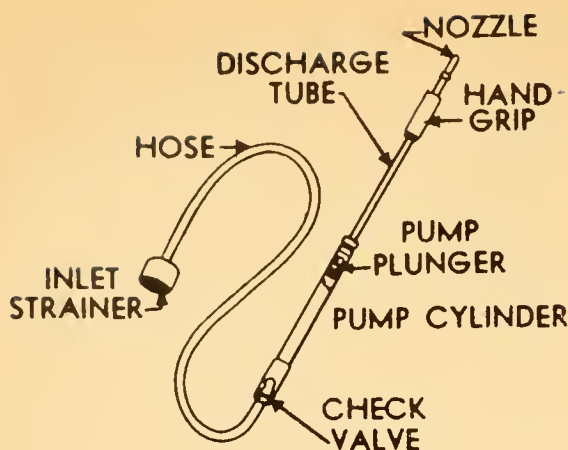
BN-8492-X

Bucket pump sprayer.



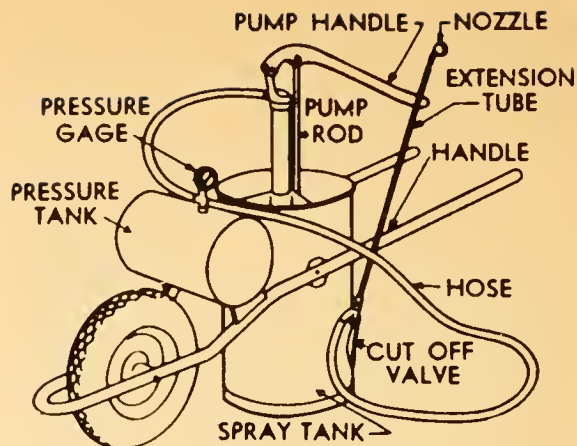
BN-8490-X

Barrel pump sprayer.



BN-8491-X

Slide pump sprayer.



BN-8489-X

Wheelbarrow sprayer.

Wheelbarrow Sprayers

Wheelbarrow sprayers—largest of the mobile, hand-operated pressure units—have capacity for spraying trees, gardens, truck crops, greenhouses, and farm buildings, and for other spray jobs where power sprayers might ordinarily be used but are not available.

The sprayer consists of a tank with a capacity of 12 to 18 gallons, a wheel-mounted frame, a hand pump similar to that on a barrel sprayer, an agitator, and a pressure gage. The discharge system consists of the hose, extension tube, shut-off valve, and nozzle. The sprayer is available with various optional parts such as steel or rubber-tired wheel, pressure tank, and narrow frame for special jobs.

Garden-Hose Sprayers

The garden-hose sprayer is designed to connect to a garden hose and utilize the household water supply and water pressure for application of pesticides. It consists of a jar for holding concentrated spray material,

a spray gun attached to the lid, and a suction hose from the gun to the bottom of the jar. A shut-off valve is provided at the gun. The gun meters out the spray concentrate from the jar by suction through jets and mixes it with the water flowing from the



BN-8479-X

Spraying fruit trees with a wheelbarrow sprayer.

garden hose through the gun. This makes a dilute spray, which is delivered from the nozzle.

A 1-quart jar of concentrated spray will make 5 to 6 gallons of dilute spray.

This type of sprayer is very useful, but is limited to the area that can be reached with the garden hose.

Traction Sprayers

The traction sprayer is a mounted, row-crop sprayer. Power to drive the pump is supplied from the wheels carrying the machine. It is usually drawn by a horse or mule and is employed principally in the cotton and tobacco areas where these animals are used.

Package-Type Dusters

Some pesticide dusts are being packaged in containers that serve as hand applicators and are discarded when emptied. These include shake types, flick types, plastic squeeze types, and plunger carton types. They are intended for rather limited use

and may be very convenient for small jobs but generally are not capable of as uniform coverage as other duster units.

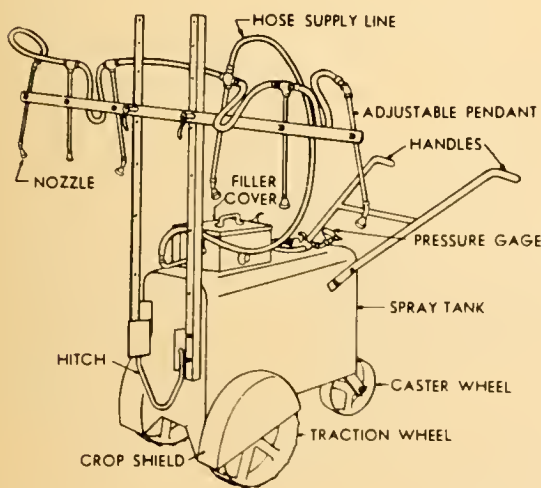
Plunger Dusters

Plunger dusters are commonly used for applying dust materials to relatively small areas or for spot treatment. They vary in size and capacity and are especially useful for such jobs as dusting vegetables and ornamental plants in the home garden and for controlling chiggers, ants, poultry pests, cattle grubs, and other pests.

The plunger duster is very simple in design. It consists of a hand-operated air pump similar to that of the household sprayer, a dust container, and the discharge assembly. Nozzles on most types may be adjusted to discharge the dust at various angles.

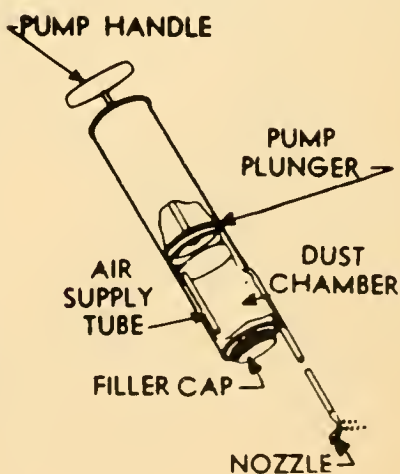
Crank Dusters

Crank dusters are used extensively in some areas for small-acreage treatment of cotton, tobacco, and truck crops. They are also used sometimes



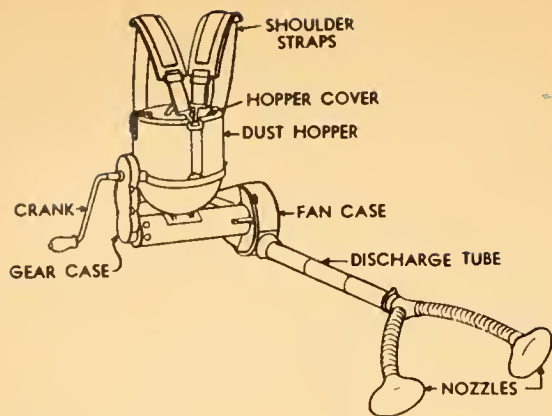
Traction sprayer.

BN-8486-X



Plunger duster.

BN-8483-X



BN-8487-X

Crank duster.

to finish up dusting operations following the use of larger machines.

The crank duster consists of a blower (which is driven by hand crank connected to high-speed gears), a dust hopper with agitator for feeding dust to the blower, the dust-delivery tubes, and nozzles. Various combinations of nozzles and tubes are supplied for covering one or two



BN-8480-X

Dusting vegetable crops with a crank duster.

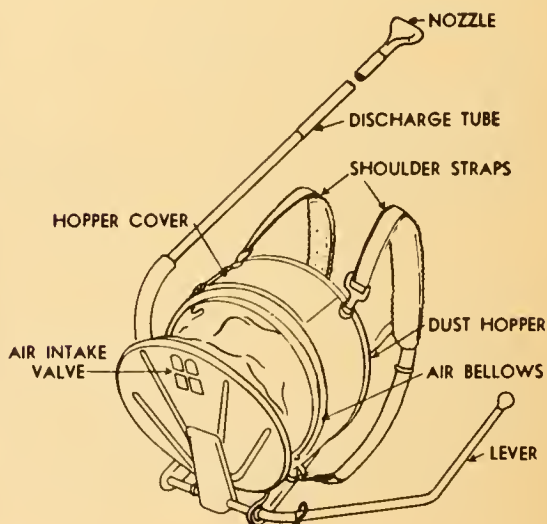
rows. An adjustable feed control is provided to regulate the feed rate. The duster is carried in front of the operator with shoulder-strap harness. Capacity of the dust hopper is approximately 5 to 25 pounds.

Knapsack Dusters

The knapsack duster is designed for carrying on the back with shoulder straps. A bellows generates the air blast, which draws dust from the dust chamber and discharges it through the nozzle outlet with each stroke of the handle. This produces an intermittent action particularly suitable for spot treatment of individually spaced plants. The hopper capacity is approximately 10 to 25 pounds.

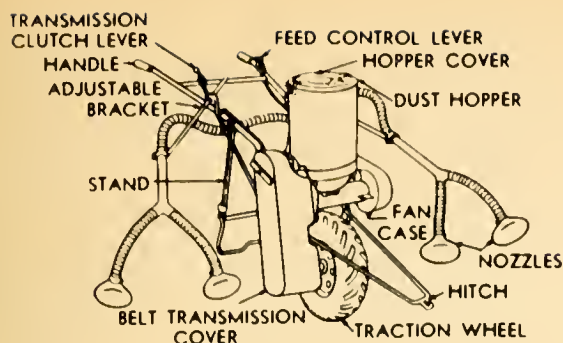
Wheelbarrow and Traction Dusters

This equipment is used for dusting row crops such as cotton, tobacco, and vegetables. It can be propelled by hand or drawn by an animal. The duster unit is similar to the crank



BN-8484-X

Knapsack duster.



BN-8488-X

Wheelbarrow-type traction duster.

duster but is generally heavier and has a larger capacity. It is mounted on a wheelbarrow-type frame having one or two wheels. Flexible tubing with various arrangements of individual tubes, Y-shaped double discharge tubes, and nozzles may be attached for treating one or two rows. One or more nozzles per row may be used; the number depends on the crop, growth stage, and coverage required. Special high-clearance two-wheeled carts are used in some areas to carry larger traction dusters. These machines may be equipped with discharge equipment for treating two to six rows.

CARE AND MAINTENANCE OF EQUIPMENT

Manufacturers of sprayers and dusters usually provide information on the care and maintenance of each type of equipment. Follow these recommendations for lubrication, operation, and maintenance.

Drain sprayer tanks after each use and flush with clean water. Where possible, disassemble and clean thoroughly all parts of the sprayer, espe-

Tables of Small Quantities

The following tables may be useful in preparing small quantities of materials.

Fluid Measure

80 drops	= 1 teaspoonful (tsp.)
3 teaspoonfuls	= 1 tablespoonful (tbsp.)
2 tablespoonfuls	= 1 fluid ounce (fl. oz.)
8 fluid ounces	= 1 cup
2 cups	= 1 pint (pt.)
2 pints	= 1 quart (qt.)
4 quarts	= 1 gallon (gal.)

Dry Measure

3 teaspoonfuls (level full)	= 1 tablespoonful
16 tablespoonfuls (level full)	= 1 cup
2 cups	= 1 pint
2 pints	= 1 quart

Dry Weight

1 ounce = approximately 2 tablespoonfuls dry weight.

cially nozzles and screens. Apply oil to parts that might rust. Before reassembling the nozzle, fill the tank partly full with water and force it through the open nozzle to clean out the discharge line.

Household sprayers require little care or maintenance. If the pump loses compression, pull the pump handle out as far as possible and put a few drops of oil in the air hole at the end of the pump cylinder.

Dusters should be emptied and cleaned after using to prevent caking and clogging and eventual corrosion. Store equipment in a dry place.



PRECAUTIONS

Pesticides used improperly can be injurious to man and animals. Use them only when needed and handle them with care. Follow the directions and heed all precautions on the labels.

Some States have special restrictions on the use of certain pesticides. Before applying pesticides, check State and local regulations.

Keep pesticides in closed, well-labeled containers in a dry place. Store them where they will not contaminate food or feed, and where children and animals cannot reach them. Promptly dispose of empty pesticide containers; do not use for any other purpose.

When handling a pesticide, wear clean, dry clothing.

Avoid repeated or prolonged contact of pesticide with your skin.

Wear protective clothing and equipment if specified on the container label. Avoid prolonged inhalation of pesticide dusts or mists.

Avoid spilling a pesticide concentrate on your skin, and keep it out of your eyes, nose, and mouth. If you get a concentrate on your skin, wash it off immediately with soap and water. If you spill a concentrate on your clothing, remove the clothing immediately and wash the skin thoroughly. Launder the clothing before wearing it again.

After handling a pesticide, do not eat, drink, or smoke until you have washed your hands and face. Wash any exposed skin immediately after applying a pesticide.

Avoid drift of pesticide to nearby wildlife habitats, bee yards, crops, or livestock. Do not apply pesticides under conditions favoring drift from the area to be treated.

Many pesticides are highly toxic to fish and aquatic animals. Keep pesticides out of all water sources such as ponds, streams, and wells. Do not clean spraying equipment or dump excess spray material near such water.

Do not apply pesticides to plants during hours when honey bees and other pollinating insects are visiting them.

Have empty pesticide containers buried at a sanitary land-fill dump, or crush and bury them at least 18 inches deep in a level, isolated place where they will not contaminate water supplies. If you have trash-collection service, thoroughly wrap small containers in several layers of newspaper and place them in the trash can.

It is difficult to remove all traces of herbicides from equipment. For this reason, do not use the same equipment for applying herbicides that you use for insecticides and fungicides.